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REPORT

OF THE

CANADIAN ARCTIC EXPEDITION 1913-18

VOLUME VII: CRUSTACEA

PART H: CLADOCERA

By CHANCEY JUDAY.

SOUTHERN PARTY—1913-16

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Part C: CUMACEA. By W. T. Calman..(*In press*).
Part D: ISOPODA. By Miss P. L. Boone.......................................(*In press*).
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Part G: EUPHYLLOPODA. By F. Johansen..........................(*In preparation*).
Part H: CLADOCERA. By Chancey Juday.......................................(*In press*).
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Part M: CIRRIPEDIA. By H. A. Pilsbry...............................(*In preparation*).

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The Cladocera of the Canadian Arctic Expedition, 1913-18.

By Chancey Juday.

Wisconsin Geological and Natural History Survey.

The plankton collections secured by Mr. F. Johansen during the Canadian Arctic Expedition are of particular interest from the standpoint of the geographical distribution of the Cladocera because they were obtained from a region in which collections had not been made previously. These entomostraca had been collected in Greenland and in Labrador on the east and in Alaska on the west, but the intervening region of Arctic North America was represented only by a single small collection; some freshwater plankton was collected at Fullerton, Northwest Territory, on the west side of Hudson bay, during the *Neptune* Expedition of 1903-4 and this material contained a single cladoceran, namely, *Daphnia pulex* (de Geer).

The present collections contain representatives of seven species of fresh water and two species of marine Cladocera. All of these species are well known and they have a wide range geographically; with one exception they are widely distributed not only in high Arctic latitudes but also in the north temperate zone. *Eurycercus glacialis*, as far as known, is confined to the Arctic regions.

The United States National Museum kindly loaned its collection of American Arctic Cladocera, and the two species of *Daphnia* represented therein have been included in this report.

FRESH WATER CLADOCERA.

Daphnia pulex (de Geer).

This species is cosmopolitan and circumpolar in its distribution. There are several varieties, at least two of which are represented in these collections. According to Lilljeborg, the species shows seasonal variations in its form, and the same appears to be true of this Canadian material.

The typical form of this species is most abundant in the collections. Specimens of the animal or of its ephippia were noted as follows:—

1. August 6, 1913. Teller (Port Clarence), Alaska. Ponds on higher tundra between big lake and sea. Few, various sizes.
2. June 4, 1914. Collinson point, Alaska. Waterhole on tundra. Ephippia.
3. June 25-26, 1914. Konganevik (Camden bay), Alaska. Margin of big lake among vegetation. Ephippia.
4. July 11, 1914. Collinson point, Alaska. In waterhole at beach, no vegetation. Temperature of water at 6 p.m., 58° F. Young, just hatched.
5. July 26, 1914. Martin point, Alaska. Big brackish lagoon about one-half foot deep, no vegetation. Temperature of water at 10 a.m., 51° F. Many, all sizes from newly hatched to full grown with parthenogenetic eggs.
6. August 14, 1914. Herschel island, Yukon Territory. Pond on north-east end of island. Abundant, some with ephippia or winter eggs.
7. June 25, 1915. Bernard harbour, Northwest Territories. Lakes and ponds on tundra, inland. Much vegetation. Many ephippia.
8. July 8, 1915. Locality, etc. as preceding. Young and ephippia.
9. July 15, 1915. Bernard harbour, Northwest Territories. Brackish pond near creek outlet. Large numbers of young, but none quite full grown. Enormous numbers of ephippia attached to filaments of algae.
10. July 19, 1915. Bernard harbour, Northwest Territories. Brackish pond near creek outlet. Many.

11. August 4, 1915. Bernard harbour, Northwest Territories. Brackish pond near creek outlet. Females with ephippia and many cast ephippia.

12. August 10, 1915. Bernard harbour, Northwest Territories. Lake. Females with ephippia.

13. September 23, 1915. Bernard harbour, Northwest Territories. Brackish pond near creek outlet. Ice one foot, water three to four feet. Ephippia.

14. October 6, 1915. Bernard harbour, Northwest Territories. Tundra ponds on top of ridge southeast of harbour. Depth of water about one foot. Temperature of water 33° F. A few specimens.

15. May 25, 1916. Bernard harbour, Northwest Territories. Brackish pond near creek outlet. Ephippia.

16. June 17, 1916. Bernard harbour, Northwest Territories. Pond on south side of Chantry island. Temperature of water 50° F. Young (just hatched) and ephippia.

17. June 20 and 30, 1916. Bernard harbour, Northwest Territories. Brackish pond near creek outlet. Young and ephippia.

18. July 3, 1916. Bernard harbour, Northwest Territories. Tundra ponds (see fig. 4) on ridge southwest of harbour. Temperature of water 55° F. Common, immature.

19. July 10, 1916. Bernard harbour, Northwest Territories. Brackish pond. Females carrying parthenogenetic eggs.

20. July 26, 1916. Cape Bathurst, Northwest Territories. Waterhole in brook-swamp on tundra. Much vegetation. Abundant, various sizes.

21. July 30, 1916. Herschel island, Yukon Territory. Pond on south end of island. Elevation about 100 feet. Many individuals of different sizes.

The specimens in the various catches seem to show that the ephippia or winter eggs begin to hatch in June, most of them probably hatching during the latter half of this month; females bearing parthenogenetic or summer eggs appear about the first week in July, while the males and ephippial females make their appearance in late July and in August. The season, therefore, is a relatively short one.

The material from the United States National Museum contained *Daphnia pulex typica* from Battle harbour, Labrador; from Point Barrow, Alaska, collected in July, 1882; and from Polaris bay, Greenland, collected by the United States North Polar Expedition on August 1, 1872. The material from Polaris bay consists of several hundred specimens, the great majority being females with ephippia. Polaris bay is located in about 82° N. latitude, which seems to be the most northerly record, so far, for any of the Cladocera. In the north this form has also been reported from Spitzbergen, Nova Zembla, Fullerton on west side of Hudson bay, and St. Paul island, Bering Sea. In the southern hemisphere it has been found as far south as the Falkland islands and Tierra del Fuego (Ekman).

A few specimens of *D. pulex* forma *aestivalis* Lilljeborg were noted in a catch obtained from a brackish pond between a big lake and the sea at Teller (Port Clarence), Alaska, on August 3, 1913.

Three specimens of *D. pulex* var. *middendorffiana* Fischer were found in a catch from a pond on the east end of Herschel island, Yukon Territory, taken on August 14, 1914. All were females carrying parthenogenetic eggs. This variety has also been noted in northern Europe, in Siberia, and in the New Siberian islands.

Daphnia longispina O. F. Mueller.

A few specimens of *D. longispina typica* were present in a catch obtained from ponds on higher tundra in the vicinity of Teller (Port Clarence), Alaska, on August 6, 1913. Different sizes were noted.

One bottle in the United States National Museum contained typical specimens of this species collected on Bering island in 1882.

Daphnia longispina var. **hyalina** forma **arctica** nova forma.

Six plankton catches (vertical hauls) obtained from big lake (see fig. 3) at Bernard harbour, Northwest Territories, between September 30, 1915, and June 12, 1916, contain a diminutive form of the variety *hyalina* which is characterized chiefly by its small size. The crest of this form is small and regularly rounded so that the eye is situated near the anterior margin and only a little below the middle of the head. The ventral margin of the head is slightly concave and the dorsal margin of the shell shows a slight concavity just above the heart. (See figures 1 and 2.)

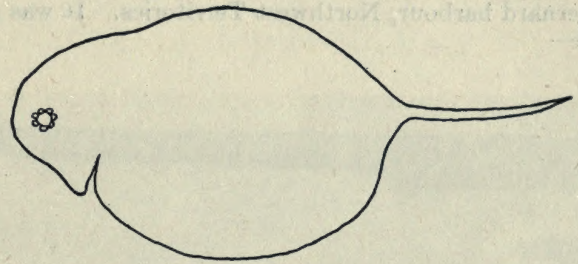


FIG. 1.—*Daphnia longispina var. hyalina* forma *arctica* nov. forma. Big Lake, Bernard harbour, Northwest Territories, September 30, 1915. Length, exclusive of spine, 0.97 mm.

The egg-bearing females obtained in September range in length from 0·9 mm. to 1·0 mm., exclusive of the spine, while the February specimens vary from 0·7 mm. to a little more than 0·8 mm. The spine is from a half to two-thirds as long as the body. No ephippial females were noted in any of the catches from this lake, but six of the samples contained parthenogenetic females; the majority of the latter carried only two eggs while a few bore as many as three, and others only one. Wesenberg-Lund also found that the parthenogenetic females of *Daphnia longispina* belonging to the *microcephala-galeata* group, in plankton material from Thingvallavatn lake, Iceland, carried but two or three eggs.

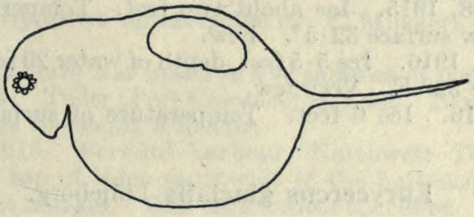


FIG. 2.—*Daphnia longispina* var, *hyalina* forma *arctica*. Big Lake, Bernard harbour, Northwest Territories, February 12, 1916. Length, exclusive of spine, 0.77 mm.

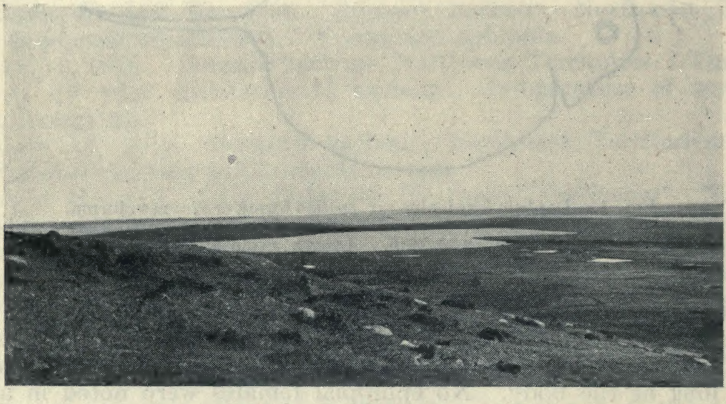
Egg-bearing females were noted in catches obtained from the lake at Bernard harbour on the following dates:—

1. September 30, 1915. Ice eight inches, depth of water 19 feet. Many.
2. November 28, 1915. Ice about two feet. Temperature of water at surface 32° F., below surface 32·5°. Few.
3. February 12, 1916. Ice 5·5 feet, depth of water 20 feet. Temperature of water at surface 32° F., air 20°. Few.

4. February 18, 1916. Ice 6 feet. Common.
5. May 6, 1916. Ice 7 feet. Temperature of surface water 32·5° F. Few. Young ones emerging from mother-animals.
6. May 21, 1916. Temperature of surface water 33° F. Young and adults, young in upper water, and older ones between 12 feet and 20 feet.
7. June 12, 1916. Ice 6 feet. Temperature of surface water 33° F., air 38°. Young and adults common.

Bosmina longirostris (O. F. Mueller).

This species appeared only in the material collected in the two big lakes (see fig. 3) at Bernard harbour, Northwest Territories. It was obtained on the following dates:—



F. Johansen, photo.

FIG. 3.—Big lake at Bernard Harbour, Northwest Territories, August, 1915.

1. September 26, 1915. Ice 7·5 inches, depth of the water 9 feet. One female.
2. September 30, 1915. Ice 8 inches, depth of water 19 feet. Common, about a quarter of the specimens with embryos in brood chamber.
3. November 28, 1915. Ice about two feet. Temperature of the water at surface 32° F., below surface 32·5°. Few.
4. February 12, 1916. Ice 5·5 feet, depth of water 20 feet. Temperature of the water at surface 32° F. Very few.
5. June 12, 1916. Ice 6 feet. Temperature of surface water 33° F., air 38°. Few.

Eurycercus glacialis Lilljeborg.

This species is one of the largest forms among the Cladocera. Some individuals reach a length of 6 mm., but in most instances they do not exceed 5 mm. As many as forty summer or parthenogenetic eggs have been found in the brood chambers of the larger females.

Several specimens 5 mm. long were noted in this material, but none exceeded this length. This form appeared in five plankton samples:—

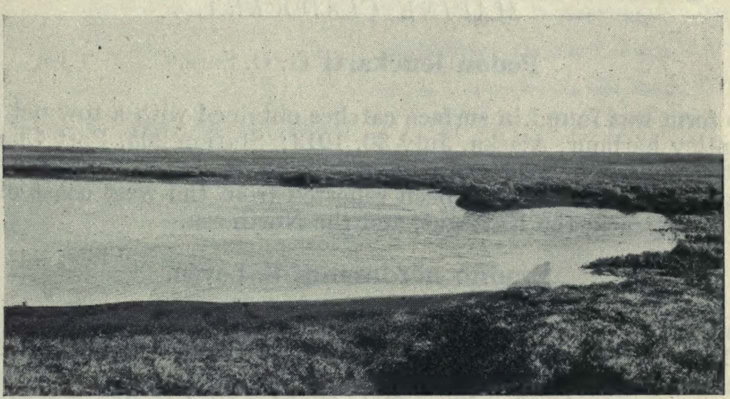
1. August 3, 1913. Teller (Port Clarence), Alaska. Brackish pond between big lake and sea. Abundant, various sizes, some full grown with summer eggs.
2. August 14, 1914. Herschel island, Yukon Territory. Pond on east end of island. Elevation about 250 feet. Much vegetation. Several adults 5 mm. long as well as smaller individuals.

3. August 10, 1915. Bernard harbour, Northwest Territories. Lake on tundra. Common, some females with ephippia.

4. August 16, 1915. Bernard harbour, Northwest Territories. Tundra ponds (see fig. 4) on top of ridge. Elevation about 100 feet. Various sizes, common.

5. July 26, 1916. Cape Bathurst, Northwest Territories. Waterhole in brook-swamp on tundra. Much vegetation. Various sizes, few.

So far this species has been found only in high northern latitudes. It has been reported from Nova Zembla, lake Enara in Finnish Lapland, Greenland, Labrador, Bering island, and St. Paul island.



F. Johansen, photo.

FIG. 4.—Pond on ridge at Bernard Harbour, Northwest Territories, July, 1916.

Alona guttata G. O. Sars.

Three mature females of this species were found in a plankton haul obtained from tundra ponds (see fig. 4) on top of ridge southwest of Bernard harbour, Northwest Territories, on July 3, 1916. Elevation about 100 feet. Temperature of water 55° F.; air 50° at 3.30 p.m.

Chydorus sphaericus (O. F. Mueller).

This cosmopolitan form was noted in five samples of plankton as follows:—

1. August 3, 1913. Teller (Port Clarence), Alaska. Brackish pond between big lake and sea. One specimen, a female.

2. August 16, 1915. Bernard harbour, Northwest Territories. Tundra ponds (see fig. 4) on top of ridge southwest of the harbour. Elevation about 100 feet. Collected at margin. One dark brown specimen.

3. September 23, 1915. Bernard harbour, Northwest Territories. Brackish pond near creek outlet. Ice 1 foot; water 3 to 4 feet. Few.

4. July 3, 1916. Bernard harbour, Northwest Territories. Tundra ponds (see fig. 4) on ridge southwest of the harbour. Temperature of water 55° F., air 50°. Few, some females with summer eggs.

5. July 26, 1916. Cape Bathurst, Northwest Territories. Waterhole in brook-swamp on tundra. Much vegetation. Few.

This species is world wide in its distribution. In the north it has been found in northern Europe and Asia, Nova Zembla, Spitzbergen, Greenland, Newfoundland, and the New Siberian islands.

Polyphemus pediculus (Linnaeus).

Many specimens of this species were found in a plankton catch taken in tundra ponds (see fig. 4) on a ridge southwest of Bernard harbour, Northwest Territories, on July 3, 1916. Temperature of water 55° F., air 50° at 3.30 p.m. According to the field notes and sketches of Mr. F. Johansen, the living animals were conspicuously coloured, which is frequently true of this cladoceran. Various sizes, some females carrying a number of eggs in the brood chamber, from which the young ones emerged the next day (July 4). This form is widely distributed in the northern portions of Europe, Asia, and North America.

MARINE CLADOCERA.

Podon leuckarti G. O. Sars.

This form was found in surface catches obtained with a tow net at Station 20*a*, Grantley harbour, Alaska, July 30, 1913; Station 20*h*, Port Clarence bay, and at Station 21 *a*, *b*, *c*, 68° 30′ N. and 166° 32′ W.

This species of *Podon* has been reported from the west coast of Norway, from the Skagerrack, the Kattegat, and the North sea.

Evadne nordmanni S. Lovén.

This marine cladoceran was obtained in surface tow net catches from Station 20*a*, Grantley harbour, Alaska; from Station 20*h*, Port Clarence bay, and from Station 21 *a*, *b*, c, 68° 30′ N. and 166° 32′ W. It was most abundant in the material from Station 20*a*. This is also a widely distributed form. In the north it has been found on the west coast of Norway, up to 72° N. latitude, in the North sea, on the west coast of Scotland, and along the coast of Nova Scotia. In the south it has been reported from the west coast of Africa.

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